

We claim:

1. In an electric arc furnace having at least one electrode and having inputs including oxygen supply and carbon supply, a method of controlling slag characteristics comprising, in combination:

introducing a charge to be melted into the furnace;
melting at least a portion of the charge to produce a melt;
introducing oxygen and carbon into the melt to enhance formation of a slag having slag conditions including a slag height and a slag coverage;
modeling the slag; and
input controlling the inputs to maximize the energy transferred from the electrode to the slag.

2. The method of Claim 1, the modeling further comprising:
receiving data including on-line measurements and inputs; and
producing modeling data.

3. The method of Claim 2, the input controlling further comprising:
receiving the modeling data in a controller; and
the controller generating instructions for adjusting the inputs to maximize the energy transferred from the electrode to the slag.

4. The method of Claim 3, the input controlling further comprising:
receiving the modeling data in an observer;
receiving the on-line measurements in the observer;
generating observer data; and
transmitting the observer data to the input controller.

5. The method of claim 2, the input controlling further comprising:
receiving the modeling data in an observer and in an input controller;
the observer receiving the on-line measurements;
generating observer data;
transmitting the observer data to the input controller; and
the input controller generating instructions for adjusting the inputs to maximize the energy transferred from the electrode to the slag.
6. The method of Claim 1, the modeling further comprising:
receiving data including on-line measurements, inputs and off-line measurement;
and
producing modeling data.
7. The method of Claim 6, the input controlling further comprising:
receiving the modeling data in a controller; and
the controller generating instructions for adjusting the inputs to maximize the energy transferred from the electrode to the slag.
8. The method of Claim 7, the input controlling further comprising:
receiving the modeling data in an observer;
receiving the on-line measurements in the observer;
generating observer data; and
transmitting the observer data to the input controller.

9. The method of claim 6, the input controlling further comprising:
receiving the modeling data in an observer and in an input controller;
the observer receiving the on-line measurements;
generating observer data;
transmitting the observer data to the input controller; and
the input controller generating instructions for adjusting the inputs to maximize the energy transferred from the electrode to the slag.

10. In an electric arc furnace having at least one electrode and having inputs including oxygen supply and carbon supply, a method of controlling slag characteristics comprising, in combination:
introducing a charge to be melted into the furnace;
melting at least a portion of the charge to produce a melt;
introducing oxygen and carbon into the melt to enhance formation of a slag having slag conditions including a slag height and a slag coverage;
receiving data including on-line measurements, inputs and off-line measurement;
producing modeling data;
receiving the modeling data in an observer and in an input controller;
the observer receiving the on-line measurements;
generating observer data;
transmitting the observer data to the input controller; and
the input controller generating instructions for adjusting the inputs to maximize the energy transferred from the electrode to the slag.